

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: Kouzou Fujino et al. : Art Unit:
 Serial No.: To Be Assigned : Examiner:
 Filed: Herewith :
 FOR: LIGHT-GUIDE PLATE, AREA LIGHT :
 SOURCE APPARATUS, AND IMAGE
 READING APPARATUS

PRELIMINARY AMENDMENT

Assistant Commissioner for Patents
 Washington, D.C. 20231

S I R :

Prior to examination, please amend the above-identified application as follows

IN THE CLAIMS:

Please replace claims 7-9, 15-19, 21, 26, 30-39 with the following amended claims:

1 7. (Amended) A area light source according to any one of claims 3, 5, or
 2 6, wherein said reflecting plate has a reflectance of 90% or more.

1 8. (Amended) A area light source apparatus according to any one of claims
 2 3, 5, or 6, wherein said reflecting plate is made of a mirror, an aluminum thin film, or
 3 a high-reflectance film.

1 9. (Amended) A area light source apparatus according to any of claims 1,
 2 2, or 6, wherein said rear surface of said light-guide plate is formed to scatter light.

1 15. (Amended) A area light source apparatus according to claim 14,
 2 wherein

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3 said light source is arranged on the peripheral side-surface of said light-guide
4 plate by fitting at least one pin formed on a side surface of said light-guide plate, into a
5 hole formed on said light source corresponding to said pin.

1 16. (Amended) A area light source apparatus according to claim 14,
2 wherein

3 said light-guide plate is fitted into said case frame and is fixed to said case
4 frame by a hook, as a projected latching portion, having an engaged surface on a lower
5 end, which is provided for said case frame or said light-guide plate.

1 17. (Amended) A area light source apparatus according to claim 14,
2 wherein

3 said light source is arranged on the peripheral side-surface of said light-guide
4 plate by fitting at least one pin formed on a side surface of said light-guide plate, into a
5 hole formed on said light source corresponding to said pin, and

6 said light-guide plate is fitted into said case frame and is fixed to said case
7 frame by a hook, as a projected latching portion, having an engaged surface on a lower
8 end, which is provided for said case frame of said light-guide plate.

1 18. (Amended) A area light source apparatus according to claim 10,
2 wherein

3 said light-guide plate is fitted into said case frame and is fixed to said case
4 frame by a hook, as a projected latching portion, having an engaged surface on a lower
5 end, which is provided for said case frame or said light-guide plate.

1 19. (Amended) A area light source apparatus according to any one of claims
2 10 to 14 or 17, wherein a concave portion for accommodating said light source is
3 provided for said case frame.

1 21. (Amended) A area light source apparatus according to claim 14,
2 wherein

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3 said light source is accommodated in a concave portion provided for said light-
4 guide plate, and

5 said light-guide plate is fitted into said case frame and is fixed to said case
6 frame by a hook, as a projected latching portion, having an engaged surface on a lower
7 end, which is provided for said case frame or said light-guide plate while a spring
8 provided for said case frame enables said light source to press said light-guide plate.

1 26. (Amended) A area light source apparatus according to claim 14,
2 wherein

3 said light source is mounted on said case frame by fitting at least one pin
4 formed on said case frame, into a hole formed on said light source corresponding to
5 said pin, and

6 said light-guide plate is fitted into said case frame so that light source is
7 arranged on the peripheral side-surface of said light-guide plate.

1 30. (Amended) A area light source apparatus according to any one of claims
2 10, 11, 14, 22, and 24 wherein said light scattering sheet is adhered to a lower surface
3 of a reinforcing frame, said case frame has a notch corresponding to a portion for
4 accommodating said reinforcing frame of said light scatter sheet at a part of an upper
5 end surface, and said reinforcing frame is accommodated in said case frame by fitting a
6 projected latching portion provided at an end surface of said reinforcing frame, into a
7 concave portion provided on an inner surface of the notch in said case frame.

1 31. (Amended) A area light source apparatus according to any one of claims
2 10, 11, 14, 22, and 24 wherein said case frame has a notch corresponding to a portion
3 for accommodating said light scattering sheet at a part of an upper end surface, and
4 said light scattering sheet is accommodated in said case frame by fitting a projected
5 latching portion provided on an end surface of said light scattering sheet, into a
6 concave portion provided on an inner surface of the notch in said case frame.

1 32. (Amended) A area light source apparatus according to any one of claims
2 11, 16, 22, 25, and 27, wherein said hooks are formed on inner surfaces opposed to

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each other, on one side of said case frame, while mutually being separated, and are formed on both sides of a mounted position of said light source.

33. (Amended) A area light source apparatus according to any one of claims 11, 16, 22, 25, and 27, wherein said hooks are formed on opposed inner surfaces on one side of said case frame, point-symmetrically to the center of said case frame, and further are formed in the center in a width direction, of opposed inner surfaces on the other side of said case frame.

34. (Amended) A area light source apparatus according to any one of claims 11, 16, 22, 25, and 27, wherein said hooks are formed on opposed inner surfaces, on one side of said case frame, while mutually being separated.

35. (Amended) A area light source apparatus according to any one of claims 11, 16, 22, 25, and 27, wherein said hooks are formed at an uppermost portion of the inner surfaces of said case frame and a height of said light-guide plate is up to the engaged surface of said hook.

36. (Amended) A area light source apparatus according to any one of claims 11, 16, 22, 25, and 27, wherein said hooks are formed at an uppermost portion of the inner surfaces of said case frame, said light-guide plate is formed with a stepped surface for being engaged to the engaged surfaces of said hook in an ascending direction and, thus, the upper surface of said light-guide plate and an outer end surface of said case frame exist on the same plane.

37. (Amended) A area light source apparatus according to any one of claims 11, 16, 22, 25, and 27, wherein said hooks are formed at an intermediate portion in a height direction of the inner surface of said case frame, said light-guide plate is formed with a stepped surface for being engaged to the engaged surface of said hook in an ascending direction and, thus, the upper surface of said light-guide plate and an outer end surface of said case frame exist on the same plane.

38. (Amended) A area light source apparatus according to any one of claims 11, 16, 22, 25, and 27, wherein said hooks are formed at an intermediate portion in a height direction of said light-guide plate and a concave portion, into which said hook is

4 fitted, is provided at an intermediate portion in a height direction of the inner surface of
5 said case frame.

1 39. (Amended) An image reading apparatus using a area light source
2 apparatus according to any one of claims 2, 4, 6, 10, 14, 22, 25, and 27, as an
3 illumination light source of a transparent original.

IN THE ABSTRACT:

Please replace the abstract with the new abstract below:

ABSTRACT

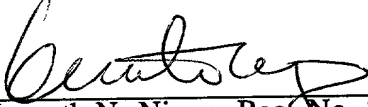
An LED module is mounted on a case frame by fitting three pins formed at a concave portion of the case frame, into holes in the LED module corresponding to the pins. A light-guide plate is fitted into the case frame formed integrally with a bottom cover in a descending direction. The light-guide plate is fixed by a hook provided for the case frame. A space between the light-guide plate and the LED module is prevented by pressing the light-guide plate to the LED module with a pressing spring. Since the light-guide plate is fitted into the case frame in the descending direction and a light scattering sheet is adhered to an outer end surface of the case frame in the descending direction, it is not necessary to reverse the worked product and so the number and time of working processes can be saved.

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REMARKS

The amendment reduces the number of claims. The abstract has been amended to meet the requirement that it be less than 150 words. No new matter has been added.

Respectfully Submitted,


Kenneth N. Nigon, Reg. No. 31,549
Attorneys for Applicant

KNN/tmb

Dated: February 21, 2002

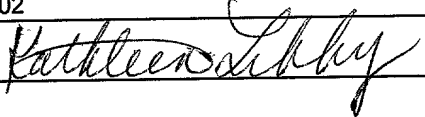
Suite 301
One Westlakes, Berwyn
P.O. Box 980
Valley Forge, PA 19482-0980
(610) 407-0700

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VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE CLAIMS:

1 7. (Amended) A area light source according to any one of claims 3, ~~to 5,~~
2 or 6, wherein said reflecting plate has a reflectance of 90% or more.

1 8. (Amended) A area light source apparatus according to any one of claims
2 3, ~~to 5,~~ or 6, wherein said reflecting plate is made of a mirror, an aluminum thin film,
3 or a high-reflectance film.

1 9. (Amended) A area light source apparatus according to any of claims 1,
2 ~~to 2,~~ or 6, wherein said rear surface of said light-guide plate is formed to scatter light.

1 15. (Amended) A area light source apparatus ~~comprising: a light guide plate~~
2 ~~which is planar shaped; at least one light source which is arranged on a peripheral side-~~
3 ~~surface of said light guide plate; a case frame for accommodating said light guide plate~~
4 ~~and said light source; a bottom cover; and a light scattering sheet arranged at an upper~~
5 ~~surface of said light guide plate,~~

6 ~~wherein said bottom cover is fixed to said case frame by fitting a projected~~
7 ~~latching portion provided on an end surface of said bottom cover, into a concave~~
8 ~~portion provided at a lower portion of an inner surface of said case frame, and~~
9 ~~according to claim 14, wherein~~

10 said light source is arranged on the peripheral side-surface of said light-guide
11 plate by fitting at least one pin formed on a side surface of said light-guide plate, into a
12 hole formed on said light source corresponding to said pin.

1 16. (Amended) A area light source apparatus ~~comprising: a light guide plate~~
2 ~~which is planar shaped; at least one light source which is arranged on a peripheral side-~~
3 ~~surface of said light guide plate; a case frame for accommodating said light guide plate~~
4 ~~and said light source; a bottom cover; and a light scattering sheet arranged at an upper~~
5 ~~surface of said light guide plate,~~

6 ~~wherein said bottom cover is fixed to said case frame by fitting a projected~~
7 ~~latching portion provided on an end surface of said bottom cover, into a concave~~
8 ~~portion provided at a lower portion of an inner surface of said case frame, and~~
9 according to claim 14, wherein

10 said light-guide plate is fitted into said case frame and is fixed to said case
11 frame by a hook, as a projected latching portion, having an engaged surface on a lower
12 end, which is provided for said case frame or said light-guide plate.

1 17. (Amended) A area light source apparatus ~~comprising: a light guide plate~~
2 ~~which is planar shaped; at least one light source which is arranged on a peripheral side-~~
3 ~~surface of said light guide plate; a case frame for accommodating said light guide plate~~
4 ~~and said light source; a bottom cover; and a light scattering sheet arranged at an upper~~
5 ~~surface of said light guide plate,~~

6 ~~wherein said bottom cover is fixed to said case frame by fitting a projected~~
7 ~~latching portion provided at an end surface of said bottom cover, into a concave portion~~
8 ~~provided at a lower portion of an inner surface of said case frame,~~according to claim
9 14, wherein

10 said light source is arranged on the peripheral side-surface of said light-guide
11 plate by fitting at least one pin formed on a side surface of said light-guide plate, into a
12 hole formed on said light source corresponding to said pin, and

13 said light-guide plate is fitted into said case frame and is fixed to said case
14 frame by a hook, as a projected latching portion, having an engaged surface on a lower
15 end, which is provided for said case frame of said light-guide plate.

1 18. (Amended) A area light source apparatus ~~comprising: a light guide plate~~
2 ~~which is planar shaped; at least one light source which is arranged on a peripheral side-~~
3 ~~surface of said light guide plate; a case frame for accommodating said light guide plate~~
4 ~~and said light source; and a light scattering sheet which is arranged on an upper surface~~
5 ~~of said light guide plate, wherein said light source is arranged on the peripheral side-~~
6 ~~surface of said light guide plate by fitting at least one pin formed on a side surface of~~
7 ~~said light guide plate, into a hole formed on said light source corresponding to said pin,~~
8 and according to claim 10, wherein

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9 said light-guide plate is fitted into said case frame and is fixed to said case
10 frame by a hook, as a projected latching portion, having an engaged surface on a lower
11 end, which is provided for said case frame or said light-guide plate.

1 19. (Amended) A area light source apparatus according to any one of claims
2 10 to ~~18~~14 or 17, wherein a concave portion for accommodating said light source is
3 provided for said case frame.

1 21. (Amended) A area light source apparatus ~~comprising: a light guide plate~~
2 ~~which is planar shaped; at least one light source which is arranged on a peripheral side~~
3 ~~surface of said light guide plate; a case frame for accommodating said light guide plate~~
4 ~~and said light source; a bottom cover; and a light scattering sheet arranged at an upper~~
5 ~~surface of said light guide plate,~~

6 ~~wherein said bottom cover is fixed to said case frame by fitting a projected~~
7 ~~latching portion provided on an end surface of said bottom cover, into a concave~~
8 ~~portion provided at a lower portion of an inner surface of said case frame, according to~~
9 ~~claim 14, wherein~~

10 said light source is accommodated in a concave portion provided for said light-
11 guide plate, and

12 said light-guide plate is fitted into said case frame and is fixed to said case
13 frame by a hook, as a projected latching portion, having an engaged surface on a lower
14 end, which is provided for said case frame or said light-guide plate while a spring
15 provided for said case frame enables said light source to press said light-guide plate.

1 26. (Amended) A area light source apparatus ~~comprising: a light guide plate~~
2 ~~which is planar shaped; at least one light source which is arranged on a peripheral side~~
3 ~~surface of said light guide plate; a case frame for accommodating said light guide plate~~
4 ~~and said light source; a bottom cover; and a light scattering sheet arranged at an upper~~
5 ~~surface of said light guide plate,~~

6 ~~wherein said bottom cover is fixed to said case frame by fitting a projected~~
7 ~~latching portion provided on an end surface of said bottom cover, into a concave~~

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8 ~~portion provided at a lower portion of an inner surface of said case frame, according to~~
9 claim 14, wherein

10 said light source is mounted on said case frame by fitting at least one pin
11 formed on said case frame, into a hole formed on said light source corresponding to
12 said pin, and

13 said light-guide plate is fitted into said case frame so that light source is
14 arranged on the peripheral side-surface of said light-guide plate.

1 30. (Amended) A area light source apparatus according to any one of claims
2 10, 11, 14, ~~to 18, 21, 22, and 24, and 26,~~ wherein said light scattering sheet is adhered
3 to a lower surface of a reinforcing frame, said case frame has a notch corresponding to
4 a portion for accommodating said reinforcing frame of said light scattering sheet at a part
5 of an upper end surface, and said reinforcing frame is accommodated in said case
6 frame by fitting a projected latching portion provided at an end surface of said
7 reinforcing frame, into a concave portion provided on an inner surface of the notch in
8 said case frame.

1 31. (Amended) A area light source apparatus according to any one of claims
2 10, 11, 14, ~~to 18, 21, 22, and 24, and 26,~~ wherein said case frame has a notch
3 corresponding to a portion for accommodating said light scattering sheet at a part of an
4 upper end surface, and said light scattering sheet is accommodated in said case frame
5 by fitting a projected latching portion provided on an end surface of said light
6 scattering sheet, into a concave portion provided on an inner surface of the notch in
7 said case frame.

1 32. (Amended) A area light source apparatus according to any one of claims
2 11, 16, ~~to 18, 21, 22, 25, and 27,~~ wherein said hooks are formed on inner surfaces
3 opposed to each other, on one side of said case frame, while mutually being separated,
4 and are formed on both sides of a mounted position of said light source.

1 33. (Amended) A area light source apparatus according to any one of claims
2 11, 16, ~~to 18, 21, 22, 25, and 27,~~ wherein said hooks are formed on opposed inner
3 surfaces on one side of said case frame, point-symmetrically to the center of said case

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4 frame, and further are formed in the center in a width direction, of opposed inner
5 surfaces on the other side of said case frame.

1 34. (Amended) A area light source apparatus according to any one of claims
2 11, ~~16 to 18, 21~~, 22, 25, and 27, wherein said hooks are formed on opposed inner
3 surfaces, on one side of said case frame, while mutually being separated.

1 35. (Amended) A area light source apparatus according to any one of claims
2 11, ~~16 to 18, 21~~, 22, 25, and 27, wherein said hooks are formed at an uppermost
3 portion of the inner surfaces of said case frame and a height of said light-guide plate is
4 up to the engaged surface of said hook.

1 36. (Amended) A area light source apparatus according to any one of claims
2 11, ~~16 to 18, 21~~, 22, 25, and 27, wherein said hooks are formed at an uppermost
3 portion of the inner surfaces of said case frame, said light-guide plate is formed with a
4 stepped surface for being engaged to the engaged surfaces of said hook in an ascending
5 direction and, thus, the upper surface of said light-guide plate and an outer end surface
6 of said case frame exist on the same plane.

1 37. (Amended) A area light source apparatus according to any one of claims
2 11, ~~16 to 18, 21~~, 22, 25, and 27, wherein said hooks are formed at an intermediate
3 portion in a height direction of the inner surface of said case frame, said light-guide
4 plate is formed with a stepped surface for being engaged to the engaged surface of said
5 hook in an ascending direction and, thus, the upper surface of said light-guide plate and
6 an outer end surface of said case frame exist on the same plane.

1 38. (Amended) A area light source apparatus according to any one of claims
2 11, ~~16 to 18, 21~~, 22, 25, and 27, wherein said hooks are formed at an intermediate
3 portion in a height direction of said light-guide plate and a concave portion, into which
4 said hook is fitted, is provided at an intermediate portion in a height direction of the
5 inner surface of said case frame.

1 39. (Amended) An image reading apparatus using a area light source
2 apparatus according to any one of claims 2, 4, 6, 10, ~~14 to 18, 21~~, 22, 25, and 27, as
3 an illumination light source of a transparent original.

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IN THE ABSTRACT:

ABSTRACT

An LED module is mounted on a case frame by fitting three pins formed at a concave portion of the case frame, into holes ~~formed to~~in the LED module corresponding to the pins. A light-guide plate is fitted into the case frame formed integrally with a bottom cover in a descending direction. The light-guide plate is fixed by a hook provided for the case frame. ~~In this case, a~~A space between the light-guide plate and the LED module is prevented by pressing the light-guide plate to the LED module with a pressing spring. Since the light-guide plate is fitted into the case frame in the descending direction and a light scattering sheet is adhered to an outer end surface of the case frame in the descending direction, the reverse of it is not necessary to reverse the worked product is not required during a working process and so the number and time of working processes can be saved.

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